I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, ON THE DATE INDICATED BELOW.

Renee Conti Date: July 25, 2005

MAIL STOP AMENDMENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Patent Application of Tadayoshi Takahashi *et al.*	Group Art Unit 1745
Conf. No.:	1638	Examiner: Julian A. Mercado
Appln. No.:	10/068,713	
Filed:	February 6, 2002	Attorney Docket No. **10059-407US**
For:	ELECTROCHEMICAL ELEMENT	(P25715-02)

DECLARATION OF TADAYOSHI TAKAHASHI UNDER 37 C.F.R. § 1.132

I, Tadayoshi Takahashi, declare and state as follows:

1. I am a co-inventor of the invention described and claimed in the above-identified patent application.

2. I completed the Master's Degree Program of Applied Chemistry at the Graduate School of Engineering of Doshisha University in March 1996.

3. From April 1996 until August 1996 I worked for Matsushita Electric Industrial Co., Ltd. Since August 1996 I have been employed by Matsushita Battery Industrial Co., Ltd., a subsidiary of Matsushita Electric Industrial Co., Ltd., where I have been engaged in the research and development of lithium secondary batteries.

4. I am familiar with the above-referenced application, and in particular with the Office Action dated March 24, 2005 (Paper No. 20050318). I am submitting the present Declaration to overcome the § 103(a) rejection of claims 2 and 4 by demonstrating differences between cyanine dye and phthalocyanine pigment.

The Examiner's Position and the Purpose of the Declaration

5. The Examiner has taken the position that the closest prior art to the invention includes U.S. Patent No. 6,146,789 of Horie et al. ("Horie") and U.S. Patent No. 4,772,291 of

Shibanai et al. ("Shibanai").

6. In the Office Action dated March 24, 2005, the Examiner rejected claims 1-8 under 35 U.S.C. § 102(e) as being anticipated by Horie or under 35 U.S.C. § 103(a) as being obvious over Horie or Horie in view of Shibanai. The Examiner argued that all of the claimed elements are taught or suggested by the cited references, including an organic pigment composed of a phthalocyanine-based metal complex, as recited in claims 2 and 4.

7. The purpose of this Declaration is to demonstrate that there is indeed an important difference between cyanine dye and phthalocyanine pigment, and that it would not have been obvious to replace a cyanine dye for a phthalocyanine pigment, nor would such a replacement yield the results observed by the present invention. This demonstration will thus overcome the rejection of claims 2 and 4.

Background and Purpose of the Invention

8. The electrochemical elements according to the invention were developed to permit the simultaneous confirmation of the applied position and uniformity of the thickness of a sealant film applied to the case, sealing plate, and gasket of the electrochemical element by visual observation or image recognition without adversely affecting the characteristics of the sealant. Previously, sealants were colorless, but we have discovered that by utilizing a sealant composed mainly of an elastomer colored by an organic pigment with a color different from the metal case and the sealing body or plate (and preferably from the gasket), it is possible to evaluate and judge the applied state of a sealant film based on the difference in saturation or color tone between the sealant and respective components. This makes reduction in the variation of the applied sealant possible, as well as minimizes unevenness of the thickness of the sealant and reduces the amount of sealant which is applied to only that which is necessary and sufficient to ensure sealing of the element. Therefore, sealant can be applied in uniform thickness to a predetermined position, such as the peripheral portion of the sealing body or plate, and can prevent leakage of the electrolyte due to variation in the applied position and film thickness of the sealant.

9. According to the presently claimed invention of claims 2 and 4, the organic pigment is composed of a phthalocyanine-based metal complex. Such metal complexes have been found to be pigments with superior properties, including excellent organic solvent resistance, alkali resistance and acid resistance with respect to various types of electrolytes such

as organic solvents, to exhibit specific gravities similar to those of the elastomers used in the sealants, and to display superior heat resistance, but do not dissolve in organic electrolytes. These properties are not exhibited by cyanine dyes.

10. In order to demonstrate the difference between cyanine dye and phthalocyanine pigment, phthalocyanine copper (phthalocyanine blue), a representative phthalocyanine pigment, and cyanin, a representative cyanine dye, were studied to assess their differences in terms of organic electrolyte resistance and thermal resistance.

Experimental Procedure

11. To measure organic electrolyte resistance, two types of organic electrolytes for lithium secondary batteries were prepared as follows:

(a) Sulfolane and tetraethylene glycol dimethyl ether were mixed together in a 1:1 volume ratio, and $LiN(CF_3SO_2)_2$ was dissolved in the mixed solvent at a concentration of 1.0 mol/L to form an electrolyte.

(b) Ethylene carbonate and gamma-butyrolactone were mixed together in a volume ratio of 1:3, and $LiBF_4$ was dissolved in the mixed solvent at a concentration of 1.5 mol/L to form an electrolyte.

12. The phthalocyanine pigment and the cyanine dye were each added separately to a sample of each electrolyte solution at a concentration of 0.1 g dye per 5 ml electrolyte at 25°C. The samples were visually examined to determine dissolution of the dye and the pigment immediately and after an elapsed period of up to 1,000 hours.

13. To measure the thermal resistance of the dye and the pigment, 0.1 g of each was placed in a separate Petri dish in a furnace containing 250° C circulating hot air for 15 minutes. Each dish was then re-weighed to determine the degree of weight loss of each material which resulted.

Results and Discussion

14. Organic Electrolyte Resistance. It was observed that all of the cyanin (the cyanine dye) immediately dissolved in both organic electrolytes. In contrast, the phthalocyanine blue (the phthalocyanine pigment) did not dissolve at all in either electrolyte, even after a period of 1,000 hours. Thus, it can be clearly seen that there is a dramatic difference in dissolution behavior and thus in organic electrolyte resistance between the cyanine dye and phthalocyanine pigment.

15. Thermal Resistance. After 15 minutes, the weight loss of phthalocyanine blue was only about 1%, whereas the weight loss of the cyanine was about 70%. Therefore, the phthalocyanine blue exhibited significantly greater thermal resistance than the cyanine dye.

Conclusion

16. This Declaration demonstrates that cyanine dyes and phthalocyanine pigments exhibit different physical behaviors with respect to organic electrolyte resistance and thermal resistance. It was observed that the phthalocyanine pigment did not dissolve in either of the two common electrolytes even after 1,000 hours, whereas the cyanine dye immediately dissolved in both electrolytes. Further, the phthalocyanine pigment exhibited thermal resistance whereas the cyanine dye lost 70% of its weight after only 15 minutes at 250°C. These experiments demonstrate the extremely different properties exhibited by cyanine dye and phthalocyanine pigment, and also that one could not simply substitute the dye for the pigment with the expectation of similar results, particularly for use in a lithium secondary battery. Further, the favorable properties of the phthalocyanine pigment, resistance to dissolution in organic electrolytes and thermal resistance, make this pigment ideal for use in the claimed invention, and result in the superior leakage resistance shown in Table 2 at page 24 of the application, a property which is not displayed by the dyes.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that those statements were made with the knowledge that willful false statements the like so made are punishable by fine or imprisonment, or both, under Section 1003 of Title 18 of the United States Code; and that such willful statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: July 22, 2005 Tadayoshi Takahashi

Tadayoshi Takahashi